

Remarks

Interview Summary

Applicants thank Examiner Umez-Eronini for the courtesy of the telephonic interview, which took place on April 25, 2006. In accordance with 37 CFR Section 133, Applicants set forth the following information. During the interview claims 1, 2, 21, and 34 in view of U.S. Patent No. 6,159,073 to Wiswesser et al. (Wiswesser) were discussed. In particular, it was pointed out that Wiswesser discloses measuring characteristics of a wafer, but he does not mention providing a model for wafer polishing that defines a plurality of annular regions on a wafer, as required by step (a) of claim 1. It was also pointed out that Wiswesser does not disclose polishing of the wafer using a polishing recipe based on the model, as required by step (b) of the claim. The model function of measured laser intensities disclosed in column 11, line 53 to column 12, line 24 of Wiswesser was discussed, and distinguished from the polishing model required by the claims. The equation for a past polishing rate at line 30 of column 12 of Wiswesser was also discussed, and distinguished from the model for wafer polishing required by claims.

Rejections under 35 U.S.C. § 112

The examiner rejected claims 2 and 34 as containing terms lacking in antecedent basis. Applicants amend claims 2 and 34 to address these rejections.

Rejections under 35 U.S.C. § 102

The Examiner rejected claims 1, 2, and 34 under 35 U.S.C. § 102(b) as being anticipated by Wiswesser. Wiswesser discloses “measuring a characteristic of a layer on a substrate during chemical mechanical polishing.” (col. 2, line 43-44, emphasis added) In contrast, claims 1, 2, and 34 require “...providing a model for wafer polishing ...” The Examiner has not pointed to any disclosure within Wiswesser that describes or even mentions such a model. Moreover, Applicants were unable to find mention of a model for wafer polishing anywhere within that reference.

During the interview, the Examiner asserted that a model function was disclosed at column 11, line 53 to column 12, line 23, of the Wiswesser patent. However, this model is not a

model for polishing the wafer, as required by claims 1 and 2. Instead, the Wiswesser passage at issue discloses a function that models the intensity $I(T_{\text{measure}})$ at polishing time T_{measure} of Wiswesser's return laser beam (ref. no. 56 in 3) in terms of the polishing time, the time interval ΔT between measured peaks in the return laser beam intensity, and empirically determined coefficients (col. 12, lines 1-12). Wiswesser uses this model to calculate the average polishing rate P during the polishing time interval from time zero to T_{measure} (col. 12, lines 24-40). Wiswesser then uses P to determine the thickness of material removed D_{removed} by the polishing (col. 12, lines 53 – col. 13, line 14). Thus Wiswesser's model is entirely concerned with a determining the amount of material already removed by recent polishing. It is not a prescriptive model for future polishing, as required by claims 1 and 2.


The Examiner also rejected claim 21 under 35 U.S.C. § 102(b) as being anticipated by Wiswesser. Claim 21 requires "...providing a model defining the effect of tool state on polishing effectiveness..." However, as indicated in the foregoing discussion, in so far as Wiswesser mentions models, they refer to past measurements of wafer characteristics. Wiswesser makes no mention of a model defining the effect of tool state on polishing effectiveness. Moreover, Applicants were unable to find any mention of any kind of model of tool state.

In view of the above, Applicants believe claims 1, 2, 21, and 34 and their dependents are patentable over the cited art, and that the pending application is in condition for allowance.

The Commissioner is hereby authorized to charge any fees should any be required for this submission, or credit any overpayment to Deposit Account No. 08-0219.

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Respectfully submitted,

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